Water and Sewerage in Scotland

INVESTING FOR OUR FUTURE

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A Consultation Paper

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Foreword

by Rt Hon Ian Lang MP

Secretary of State for Scotland

Water and sewerage are vital services for all of us. At present, they are provided by regional and islands authorities. With the forthcoming reform of local government, the task now is to get the right structure for the future. We must identify the best means of achieving and maintaining the highest quality standards for our drinking water; to protect our rivers, lochs and coastal waters from pollution and to secure the billions of pounds of capital investment which will be needed over the next decade to ensure this happens.

It is important that these goals are achieved. They will not be cheap and the cost will inevitably need to be borne by consumers one way or another. It is not simply a question of paying for the water, of which, we all know, Scotland has more than enough. It is a question of paying for the pipes, treatment works and waste disposal systems which we all take for granted but without which the quality of our lives and of our environment would be so much poorer.

It is a key element of the Government's approach that cost increases should be kept as low as possible. That is why it is important to get a structure for the services capable of ensuring that the necessary investment is made and that the services are run with maximum efficiency so that the environment can be protected and full value for money given to the consumer. The future of the water and sewerage services in Scotland is a practical problem to which we must find a practical solution.

This consultation paper sets out a number of options for a structured industry, in both the public and private sectors. The Government will reach a decision on the right way forward in the light of responses to this consultation paper. Until then I intend to keep all options open.

Ian Lang

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Chapter 1 Setting the Scene

1.1 Public water and sewerage services are currently provided in Scotland by the 9 regional and 3 islands councils. Reform of local government makes it necessary to decide how these services should be provided in future. It also creates an opportunity to look at new ways of financing and managing the services to ensure they follow best business practice, observe high environmental standards and deliver the best possible deal to the consumer.

1.2 This consultation paper describes the present circumstances of the industry and the challenges it faces in the future; and sets out a number of options for restructuring it to meet those challenges. The Government invite comments on this paper and will carefully consider all views expressed before reaching a decision on the shape of Scotland's water and sewerage services for the future.

The Historical Background

Water

1.3 The development of public water supply in Scotland has seen the involvement of a wide range of agencies. In the early 17th century Edinburgh Town Council promoted legislation to permit them to develop local supplies. This, however, was an isolated instance and prior to the mid-19th century there were no generally available public water supplies. At about that time, with growing awareness of the link between contaminated drinking water and disease, major new works were undertaken by Glasgow Corporation at Loch Katrine, again using local legislation, and by other municipalities. By the start of the 20th century the four major Scottish cities all had developed their own supplies and the independent providers declined in number although some remained in existence until the 1940s.

1.4 General legislation on public water supplies first appeared on the statute book in 1833, and thereafter on a number of occasions throughout the 19th century, conveying powers to an ever-widening range of authorities to provide the service. Where these powers were not duly exercised there was provision for proceedings to be taken against the council concerned. There were five such legal cases between 1874 and 1913.

1.5 The general powers in these early Acts proved deficient in many respects and most authorities had recourse to local legislation until the advent of the Water (Scotland) Act of 1946. That Act first provided the basis for most of the powers and duties of local authorities today. At that time most councils acted independently to provide water supplies, although there were examples of groupings of authorities. At the end of the war there were 210 water authorities in Scotland - 170 town councils, 32 county councils, 6 water boards and 2 non statutory water companies.

1.6 As more attention began to be paid to the quantity and quality of supplies and as demand grew steeply, it was increasingly recognised that many of these authorities were too small to provide an effective service. This led to the creation in 1967 of 13 single purpose regional water boards and also the Central Scotland Water Development Board (CSWDB). All board members were elected representatives of local authorities in their areas. The purpose of the CSWDB was to provide bulk supplies to authorities within the central belt. The next change came with the reform of local government and the creation of the current system of regional, district and islands councils in 1975. While the water boards were taken into the new system, the CSWDB remained separate, its members coming from the relevant regional councils which provided the water service.

Sewerage

1.7 The history of the public sewerage service in Scotland has followed a course not dissimilar to that of water. At the beginning of the 19th century there was widespread reluctance to use water to flush away domestic wastes. This attitude persisted for some time. In the latter half of the century many health authorities still considered water closets to be wasteful and unnecessary luxuries and favoured dry privy sanitary systems. However, the conclusion reached by various Commissions appointed between 1857 and 1868 was that sewage should be collected from individual properties and conveyed by sewers to a central point for disposal, and this led to the development of the present day system.

1.8 General legislation on the provision of sewerage services followed the Commissions' reports, but most authorities supplemented these powers through local legislation. The Sewerage (Scotland) Act 1968 came into force in 1973. This Act, based on the best local authority practice of the time, placed a duty on local authorities to provide sewerage systems to drain their areas of domestic sewage, surface water and trade effluent.

1.9 In 1973 those duties were exercised by 234 separate local authorities - 4 cities, 21 large burghs, 176 small burghs and 33 county councils. This structure was replaced in May 1975 by the present system where the 9 regional and 3 islands councils are responsible for sewerage, sewage treatment and disposal.

The Present Organisation

1.10 Current legislation provides that the regional and islands councils act both as water authorities under the Water (Scotland) Act 1980 and providers of the sewerage services under the Sewerage (Scotland) Act 1968. Water authorities have a duty to provide a wholesome supply of piped water where it is required for domestic purposes unless this cannot be done at reasonable cost. Wholesomeness is defined in the Water Supply (Water Quality) (Scotland) Regulations 1990 by reference to minimum and maximum levels for certain water quality parameters. Under the sewerage legislation local authorities are required to provide public sewers to drain domestic sewage, surface water and trade effluent and to treat or otherwise deal with the contents of the sewers. They must take their sewers to points that enable connections to be made at reasonable cost but are not required to do anything which is not practicable at a reasonable cost to themselves. Figure 1 shows the present organisation.

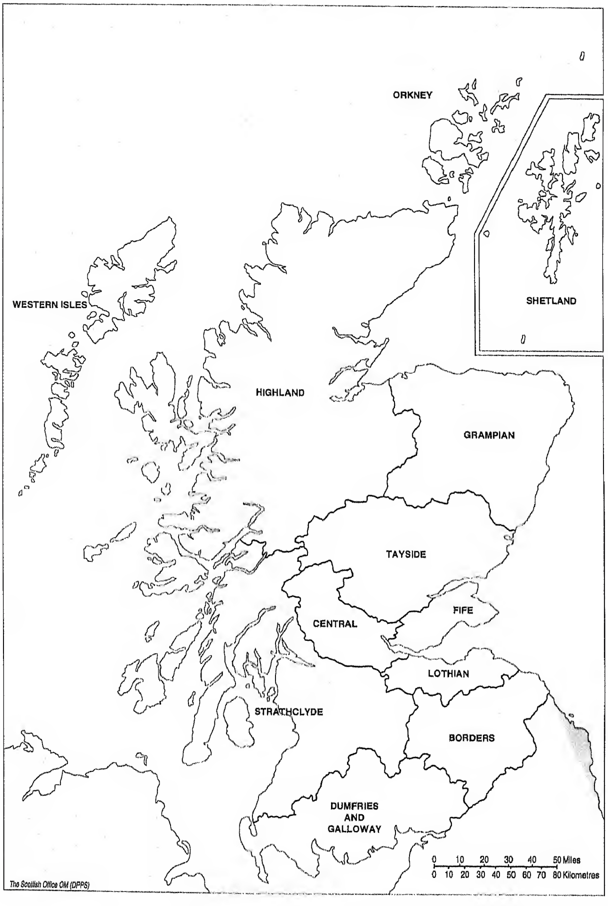


Figure 1 *Water and Sewerage Administrative Areas*

1.11 The Central Scotland Water Development Board's main function is to develop new sources of water supply for the purpose of providing water in bulk to 2 or more of the 5 water authorities within its area (Tayside, Fife, Lothian, Central and Strathclyde). The Board operates 2 water supply schemes, Loch Lomond and Loch Turret. The latter scheme includes a hydro-electric power station in Glen Turret.

Pollution Control

1.12 Preventing the pollution of inland and coastal waters, including the control of discharges of sewage, is on the mainland of Scotland the responsibility of separate agencies, the 7 river purification boards. In the islands areas these responsibilities also fall to the islands councils. The Government have already announced their intention to bring together the responsibilities of all the river purification authorities and other pollution control agencies to form the new Scottish Environment Protection Agency (SEPA).

The Scale of Services

1.13 The majority of Scotland's 5 million population lives in the central belt between the Clyde, Forth and Tay estuaries. Of an estimated 2.2 million households, about 98 per cent are supplied with public water and 95 per cent of the population are served by public sewerage systems. The extensive infrastructure also serves industry and commerce. Properties not connected to the public system, mainly in the remoter rural areas, have their own private water supply and sewerage arrangements. Each day, around 2.3 million cubic metres of potable water are supplied from 603 treatment plants to domestic and industrial consumers through an estimated 44,500 to 46,000 kilometres of water mains. Domestic sewage, surface water and trade effluent are collected and drained by a network of public sewers totalling between 26,000 and 28,000 kilometres in length. About 73 per cent of the contents of public sewers are treated at more than 900 sewage treatment works before being discharged to rivers, estuaries and coastal waters. Sludge, the by-product of the treatment process, may be further treated before disposal. At present, regional and islands councils' water and sewerage departments and the Central Scotland Water Development Board employ over 6,200 people; 3,600 on water supply and 2,600 on sewerage and sewage treatment.

Detailed statistics of current services are contained in Tables 1-3.

Table 1: Populations and Areas 1990-91

Authority	Area Served Admin sq km	 Water Supply sq km	 Sewerage sq km	Resident Population* Water Supply No 000's	 Connected %	 Sewerage No 000's	 Connected %
Borders	4,714	4,714	4,714	103	86.4	103	81.5
Central	2,636	2,849	2,636	385	98.7	272	96.7
Dumfries & Galloway	6,402	6,402	6,402	147	89.8	147	85.0
Fife	1,308	1,554	1,308	353	98.9	345	98.0
Grampian	8,704	8,704	8,704	506	93.0	506	87.5
Highland	25,304	25,304	25,304	204	97.5	204	80.4
Lothian	1,756	1,756	1,756	750	100.0	750	98.0
Strathclyde	13,850	13,637	13,850	2,220	99.8	2,333	98.4
Tayside	7,503	7,257	7,503	386	97.1	394	92.9
Orkney	910	910	910	19	98.0	19	47.3
Shetland	1,468	1,468	1,468	23	99.0	23	65.0
Western Isles	2,898	2,898	2,898	31	98.0	31	75.0
SCOTLAND TOTAL	77,453	77,453	77,453	5,127	98.1	5,127	94.8

* Some regional authorities in central Scotland provide water to areas in adjacent regions.
Source: CRI, The UK Water Industry, Water Services and Costs 1990-91.

Table 2: Service Infrastructure 1990-91

Authority	Length of Water Mains km	Number of Water Treatment Plants	Length of Sewers km	Number of Sewage Treatment Plants
Borders	1,389	30	700	38
Central	2,384	12	1,350	61
Dumfries & Galloway	3,152	22	600	61
Fife	2,580	5	1,880	72
Grampian	5,517	97	3,243	136
Highland	4,760	156	1,047	338
Lothian	5,406	14	4,850	42
Strathclyde	14,000	156	11,500	107
Tayside	3,996	29	1,730	73
Orkney	790	13	121	1
Shetland	978	28	520	0
Western Isles	945	38	255	4
Central Scotland Water Development Board	129	3	-	-
SCOTLAND TOTAL	46,026	603	27,796	933

Source: CRI, The UK Water Industry, Water Services and Costs 1990-91.

Table 3: Employment

Authority	Water Supply 1990/91	Sewerage and Sewage Treatment 1990/91	Total 1990/91
Borders	102	87	189
Central	211	181	392
Dumfries & Galloway	127	99	226
Fife	250	146	396
Grampian	420	372	792
Highland	243	147	390
Lothian	386	356	742
Strathclyde	1,469	995	2,464
Tayside	294	217	511
Orkney	29	29	58
Shetland	25	6	31
Western Isles	23	8	31
Central Scotland Water Development Board	68	-	68
SCOTLAND TOTAL	3,647	2,643	6,290

Source: CRI, The UK Water Industry, Water Services and Costs 1990-91.

Financing and Charging

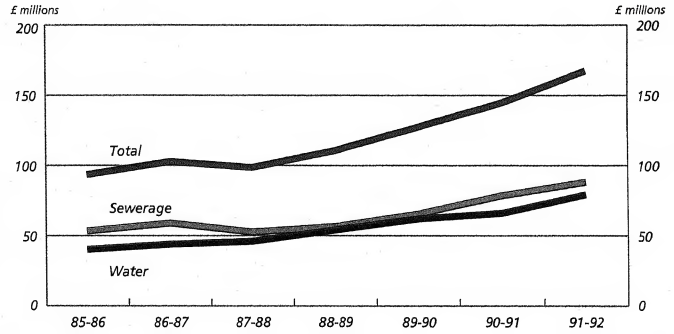
1.14 Capital expenditure is undertaken by the regional and islands councils to meet the following objectives:

- to provide water and sewerage services for new housing developments or unserviced communities, for new industrial sites and for other development initiatives;
- to provide or upgrade water treatment facilities to meet statutory requirements for water quality;
- to provide or upgrade sewage treatment and disposal facilities to meet statutory standards relating to the quality of effluents or receiving waters; and
- to renew, renovate or replace sewers, water mains, treatment works and other parts of the infrastructure.

1.15 Capital expenditure is also undertaken by the Central Scotland Water Development Board for the supply of water in bulk to regional councils in the central belt.

1.16 Capital expenditure on the programme as a whole is subject to the consent of the Secretary of State. Each year, capital allocations are made to the authorities based on an assessment of their relative needs. These allocations are not cash sums but consents to incur capital expenditure up to stated limits. For 1992-93, provision for capital expenditure on water and sewerage totalled £218 million, more than twice the figure for 1987-88. At present, authorities may augment spending above their allocations by using capital receipts received in year and by funding capital expenditure from current revenue. Grant assistance is available from central government towards the cost of eligible rural water supply schemes and for the provision of water and sewerage infrastructure to serve industry in certain areas. In addition, programmes of sewerage improvements which reduce pollution can attract grant under the Government's Sewerage Improvement Grant Scheme (up to 1993-94). Water and sewerage projects may also be eligible for European Regional Development Fund assistance.

Figure 2 *Outturn Capital Expenditure for Water and Sewerage Services*



Source: The Scottish Office Environment Department

1.17 For 1992-93, the estimated cost of providing water and sewerage services in Scotland is £445 million. After allowing for factors such as other income including trade effluent charges the costs to be met amount to £392 million; £210 million for water from charges and rates levied on consumers and £182 million for sewerage from non-domestic rates and the local authorities' general funds. These costs include loan charges and repayment of debt associated with capital expenditure. Community charge payers receiving a public water supply pay the corresponding community water charge. From 1 April 1993, under the council tax arrangements, householders will pay a council water charge based on the valuation band of their property, unless they choose to have a metered supply. Non-domestic consumers with a metered supply are charged by volume; those who do not have meters pay non-domestic water rates. These separate charging arrangements for non-domestic consumers will not be affected by the introduction of the council tax. Domestic sewerage is currently financed from the community charge - and will be financed from the council tax after 1 April 1993. Commercial and industrial premises pay non-domestic sewerage rates, and these will continue to be levied after 1 April 1993. Trade effluent charges are also made by most authorities.

1.18 For 1992-93, the estimated average cost for water and sewerage for each household in Scotland is £102. This is about 40 per cent more than in 1989-90. Household bills will continue to rise in the future, whatever new structure is chosen, in line with the cost of new investments in water and sewerage services.

1.19 At present, water is cheapest in Central Region at about two thirds the Scottish average and most expensive in Western Isles, at 75 per cent more than the Scottish average. Sewerage is cheapest in Orkney and most expensive in Western Isles. Table 4 shows estimated costs for the average household over the period 1989-90 to 1992-93, and Table 5 sets out rates and charges for water and sewerage in 1992-93.

Table 4: Estimated Average Cost Per Household 1989-90 to 1992-93

Authority	Total 1989-90 £	Total 1990-91 £	Total 1991-92 £	1992-93 Water £	1992-93 Sewerage £	1992-93 Total £
Borders	106	105	113	71	66	137
Central	69	68	75	36	49	85
Dumfries & Galloway	88	108	111	64	60	124
Fife	63	56	72	44	39	83
Grampian	93	95	117	70	48	117
Highland	67	79	97	60	48	107
Lothian	70	72	92	53	47	100
Strathclyde	70	74	92	58	44	102
Tayside	70	69	89	46	48	94
Orkney	58	72	104	82	31	113
Shetland	40	94	111	76	44	120
Western Isles	104	135	147	98	70	167
SCOTLAND (Weighted average)	73	76	93	56	46	102

Figures may not add up due to rounding.
Source: The Scottish Office Environment Department.

Table 5: Rates and Charges for Water and Sewerage 1992-93

Authority	Direct (Metered) Charges p/m3	Community Water Charges £	Non-domestic Water Rates p	Sewerage Costs met out of Community Charges £	Non-domestic Sewerage Rates p
Borders	64.40	41.00	7.20	38.26	7.50
Central	27.50	20.00	3.40	26.40	6.10
Dumfries & Galloway	55.10	36.00	5.80	33.17	6.70
Fife	34.00	25.00	6.50	22.00	4.20
Grampian	54.00	40.00	7.00	26.50	6.30
Highland	44.00	38.00	7.50	28.29	5.40
Lothian	40.40	30.00	3.40	26.00	2.70
Strathclyde	33.20	34.00	4.50	24.00	4.30
Tayside	38.00	28.00	4.10	28.29	5.70
Orkney	68.00	57.00	8.00	18.00	9.00
Shetland	56.58	46.00	10.60	25.79	8.60
Western Isles	62.00	58.00	24.00	40.00	13.80
SCOTLAND (Weighted average)	37.34	32.77	4.98	25.68	4.59

Source: The Scottish Office Environment Department.

Chapter 2 How the Industry Works

The Water Cycle

2.1 Virtually all of the world's water is held in the oceans or frozen in the polar ice caps. The remainder provides not only the water we use, but includes all the world's lakes and rivers, all the water in the atmosphere and in the ground.

2.2 Water does not get used up but constantly circulates. It evaporates from the land and the sea, and transpires from plants. Water vapour is drawn up into the atmosphere where, in the form of clouds, it is carried by winds until it falls again as rain or snow, or condenses as dew. It then drains to rivers and lochs and eventually to the sea. This continuous process is known as the hydrological, or natural water, cycle.

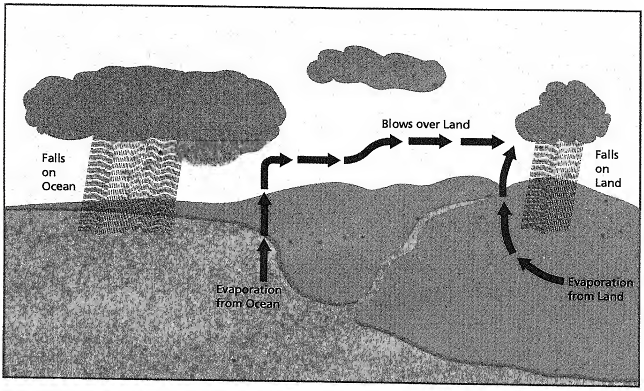


Figure 3
The Natural Water Cycle

2.3 About one third of our rainfall is lost for immediate use through evaporation from the land and other losses. We are therefore left for our needs with the water that soaks through the ground and the water which ends up in rivers and lochs. In Scotland this is ample for all purposes. Existing usage for public supply amounts to little more than 1 per cent of what is available in rivers and lochs.

2.4 The use of water and its transportation have developed over the centuries to the point where today most of us simply turn a tap in our homes to receive a supply of high quality water. Behind this simple action lies a complex network of reservoirs and pipes, treatment works and storage tanks, pumphouses and laboratories. Advances in living standards and the industrial and agricultural developments that underpin them impact upon our water supply. Water which has been used and soiled finds its way back to the natural watercourses and can degrade the quality of these as sources of supply. A detailed system of checking, treating and purifying the water has therefore been developed to ensure that it remains safe to drink. Waste water may need to be treated at treatment works to ensure that it will not harm human, animal or plant life when it is put back into rivers. For our survival and development, we have thus intervened in the natural hydrological cycle by abstracting water from natural sources and returning it to the environment after use. In doing so, we have generated a man-made cycle within the natural cyclical process. The water authorities, through the supply of water and the removal and treatment of waste water, and the river purification authorities, through the control of discharges to rivers, estuaries, coastal waters and groundwater, are responsible for the management of this man-made cycle.

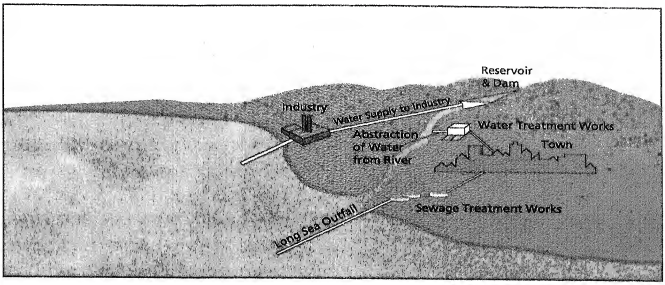


Figure 4
The Man-Made Water Cycle

Scotland's Water Resources

2.5 Scotland has more than 800 sources of public water supply with a developed yield of almost 3.5 million cubic metres per day. About 85 per cent of this comes from 350 or so lochs and reservoirs. Some 12 per cent comes from direct abstraction from rivers. The remaining 3 per cent is from springs or boreholes but in certain areas authorities may rely on underground supplies much more. For example in Borders they account for around 20 per cent of water available for use. An indication of the distribution of the lochs and reservoirs used for public supply is given in Figure 6.

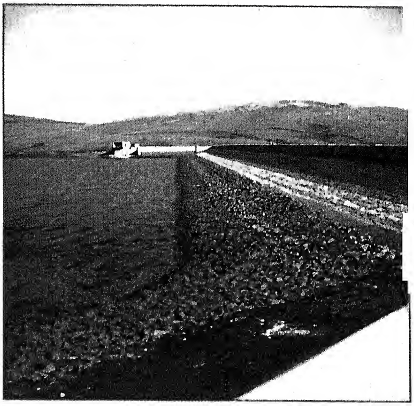


***Figure 5**: Upland Reservoir*

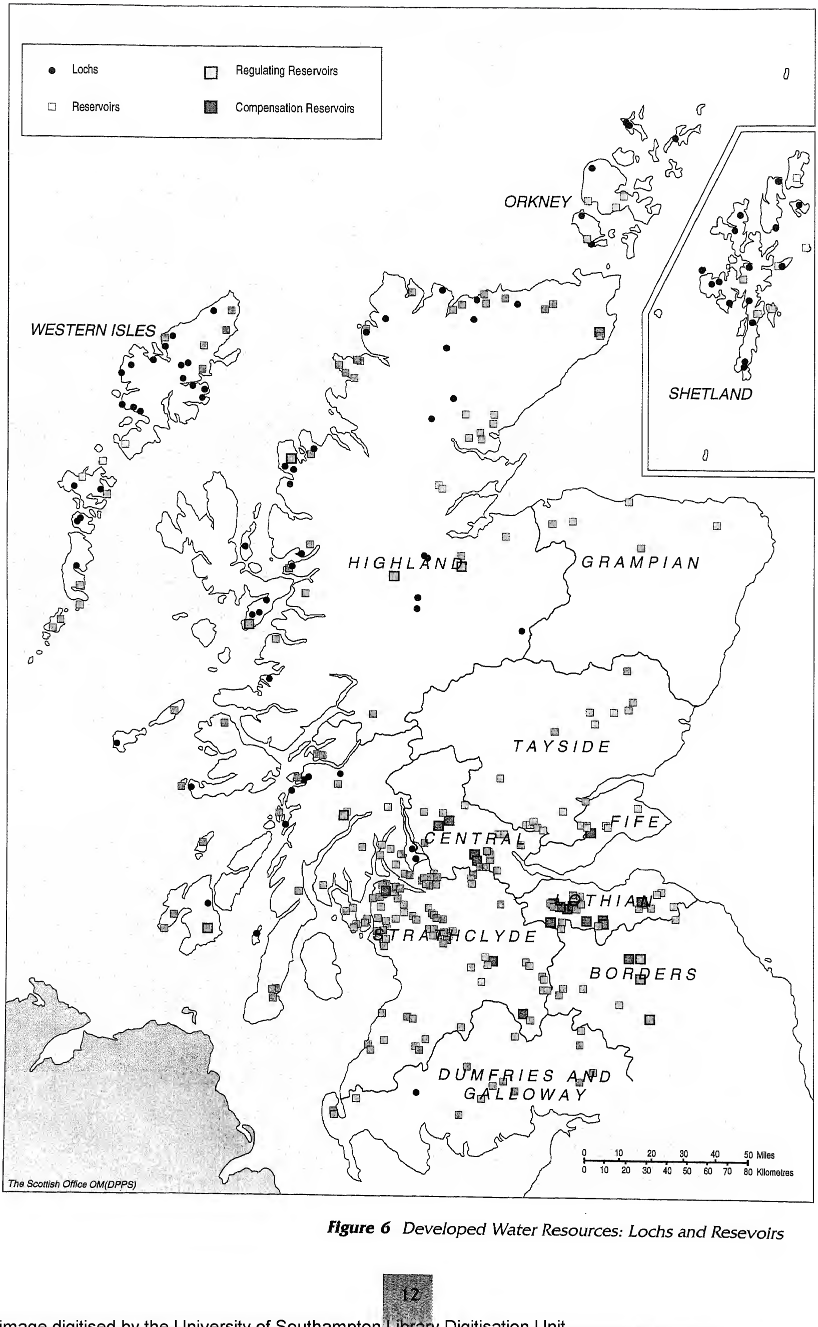
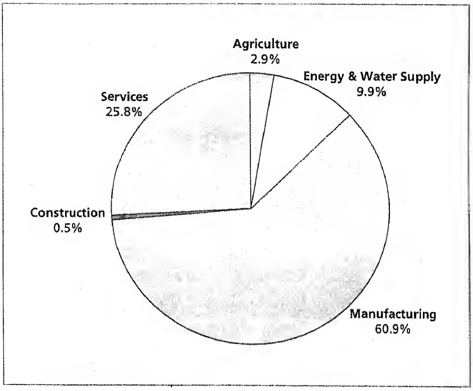


Figure 6 Developed Water Resources: Lochs and Resevoirs

2.6 During the 1970s water demand in Scotland amounted to around 70 per cent of the available developed resources. Today around 65 per cent of our resources are used. Supplies are therefore plentiful in Scotland but a substantial safety margin needs to be maintained for flexibility in the use of resources and for reliability in cases of emergency or short term deficiencies. Ratios of demand to resources can vary widely from the overall national figure in different localities across the country.

Figure 7 *Metered water use*



Source: The Scottish Environment - Statistics by The Scottish Office

2.7 About 30 per cent of the public water supplies in Scotland are used by commerce and industry and are metered. Figure 7 gives an indication of water use by large industrial users.

Water Treatment and Distribution

Treatment

2.8 Most of Scotland's water is drawn from upland catchments which provide raw water which is generally of good quality but which can be soft and acidic. Many Scottish waters contain organic matter collected from the peaty soils of the catchment and consequently in some areas can be discoloured. Significant amounts of natural iron and manganese are often present. The nature of the water can sometimes cause it to absorb lead and other metals from pipes and fittings. Treatment usually entails some form of filtration to remove organic matter and colour. Passing the water through fine screens and settling tanks are other treatment methods. Many works employ a coagulating agent to improve the efficiency of the filter. These agents are themselves removed as part of the treatment process.

2.9 About 90 per cent of the population receives water which has also been treated to reduce its natural acidity, usually by dosing with lime. Some waterworks incorporate carbon filters to improve the taste and smell of the water. Disinfection is usually by chlorination and ensures that the water is bacteriologically safe to drink. The use of fluoride in water to improve dental health is under consideration by health authorities, but no fluoride dosing is currently carried out in Scotland.

Distribution

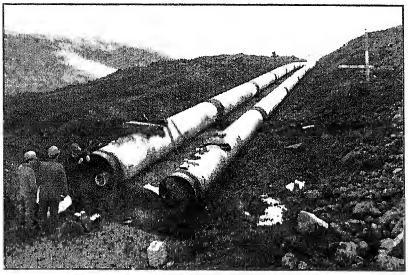


Figure 8 *Water Main Laying*

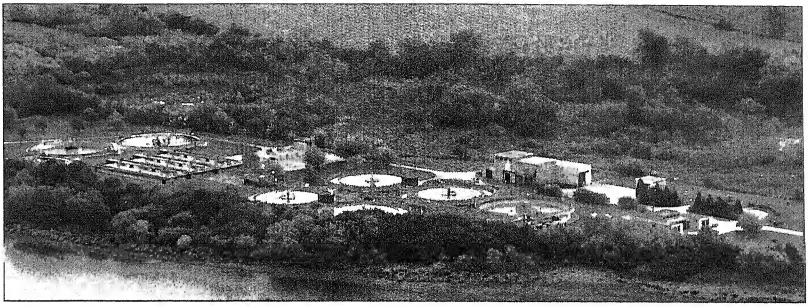
2.10 Water collected in upland areas requires little or no pumping and can supply lower lying areas by gravity. Where water is taken from the lower reaches of rivers or from underground sources, pumps may be required to provide the extra pressure necessary to transport the water. Storage or service reservoirs are usually sited on high ground above the districts they serve. If no high ground is available a water tower may have to be built. These storage reservoirs and works supply an extensive system of pipes to distribute the water to the consumers.

2.11 Scotland's network of water mains amounts to about 9 metres per person. It is estimated that well over half of these pipes are more than 50 years old, and some are more than 100 years old. The majority of water mains are made from iron or steel, although some pipes are made from concrete, asbestos-cement, or plastics. Much of the network is thought to be in poor condition. This leads to frequent failures, much reduced carrying capacity, significant leakage and the deterioration of water quality, especially in old unlined cast iron mains. As a result, authorities are developing substantial programmes of mains replacement or refurbishment. In all, the local authorities administer more than 700 supply zones and renewal of at least some part of the network will be needed in the majority of zones. The scale of the operation may be gauged from the need identified by Scotland's largest water authority, Strathclyde Regional Council, to replace or refurbish an average of about 270 kilometres per year for the next 10 years and beyond.

Sewerage, Sewage Treatment and Disposal

2.12 About 95 per cent of Scotland's population live in houses connected to publicly owned and maintained sewerage systems, and most others are served by private septic tanks. Varying degrees of treatment are applied to sewage, depending largely on a range of factors associated with the water into which the treated effluent is to be discharged. At present some coastal discharges receive little or no treatment, whereas inland discharges normally receive much higher standards of treatment. In general, the varying standards reflect the effect of the discharge on the receiving water and the nature of other legitimate uses of that water.

Figure 9 *Sewage Treatment Plant*



2.13 The various sewage treatment processes produce sewage sludge - 80,000 dry tonnes in 1990 which is expected to rise to 140,000 dry tonnes by 1999. This is disposed of in a number of ways. The predominant disposal methods in 1990 were 75 per cent disposed of at sea (a practice which is to cease by 1998) and 15 per cent used for the beneficial conditioning of agricultural or other land. Other methods include landfill (7 per cent) and incineration (1 per cent).

2.14 Considerable effort and expenditure will have to be directed, not only to extending sewerage systems and increasing treatment levels, but also to maintaining, repairing and upgrading the existing infrastructure. As the sophistication of treatment processes increases, so the commitment to maintenance, repair and upgrading will expand.

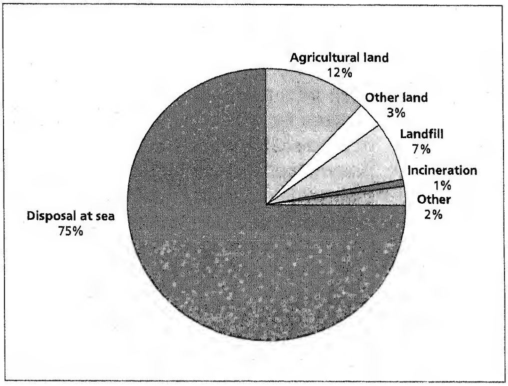


Figure 10 *Sewage Sludge Disposal 1990*
(Total=80,000 tonnes dry solids)

Chapter 3 Current and Prospective Developments

3.1 Water and sewerage services in Scotland are of high quality and the Government intend that they should remain so. To do this it is not enough to stand still. Technology and expectations continually improve and additional investment will be required to meet those expectations and take advantage of the technological advances which both create them and make them capable of realisation. In recent years the Government have supported a number of European Community initiatives in this field. Most significant are the Drinking Water Directive, the Bathing Water Directive and the Urban Waste Water Treatment Directive.

Drinking Water

3.2 The EC Drinking Water Directive set standards for over 60 parameters of water quality, patterns and frequencies of sampling, and reference methods of analysis. The standards are based largely on the World Health Organisation recommendations.

3.3 The Water Supply (Water Quality) (Scotland) Regulations 1990 adopted the standards of the Directive, in addition to introducing other new national standards on quality and sampling. Relaxations of standards may be authorised by the Secretary of State in specified circumstances and only where no risk to public health would result. Most of the relaxations authorised relate to naturally occurring colour, iron or manganese. Relaxations have been permitted in more than 400 supply zones, around two thirds of these for a limited period of time. About half of the total number of zones cannot continuously achieve the required standards for parameters such as aluminium, microbiological quality, lead, trihalomethanes and iron. Improvement programmes have been devised. These programmes are covered by legal undertakings and form a main part of the legislative procedure for achieving compliance with the standards.

3.4 Breaches of standard are, however, often marginal and intermittent. In the six months during which the Regulations applied in 1990, out of more than 104,000 tap samples analysed for individual parameters, around 600 per day, almost 97 per cent met the relevant standards.

Water Pollution Control

3.5 All discharges to water - including sewage discharges - require a discharge consent from the river purification authority for the area. Authorities have wide powers to impose consent conditions to control the impact of each discharge on the environment, according to circumstances. The standards set for discharges are, in general, linked to desired water quality standards for the receiving waters - rivers, estuaries, coastal waters etc. Scotland's rivers are of high quality with a 1990 survey showing that 97 per cent of river lengths were unpolluted.

3.6 Improvements are needed, however, to meet existing and impending requirements. Sewerage authorities are at present undertaking a programme of works to ensure that bathing water at specified sites complies with the EC Bathing Water Directive. In addition, sewerage authorities will need to meet the requirements of the EC Urban Waste Water Treatment Directive by dates ranging from 1998 to 2005. This Directive requires all sewage discharges within its scope to receive treatment, with secondary treatment being specified as the norm for discharges above a prescribed limit. It also requires discharges from certain industrial sectors to meet standards set by the Member State. The Directive also reinforces the Government's 1990 initiative to stop the dumping of sewage sludge at sea by 1998. This has significant implications for those Scottish authorities which presently use this disposal route. Together with other authorities they are now considering other options for sludge disposal; these include incineration, landfill and spreading on agricultural land.

Investment Requirements

3.7 All this means that over the next 15 years or so substantial capital expenditure will be required for Scottish water and sewerage services. It is not possible to put a precise figure on the cost, but current indications are that up to £5 billion might be needed. About half of this will be accounted for by new work to improve quality in both the water and sewerage services, in roughly equal parts for each, and half will be needed for maintenance and replacement of existing infrastructure and the provision of services for new development.

Chapter 4 The Approach to Restructuring

4.1 This examination of the structure of water and sewerage services takes place against a background of Government proposals to change the structure of local government in Scotland. The Government have announced their intention to change the present two-tier structure of local government in Scotland by moving to a single -tier structure and a consultation paper was published on 12 October 1992 which invited views on what form that structure should take. That paper included 4 illustrative structures: one comprising 15 authorities, based largely upon existing Health Board boundaries and others of 24, 35 and 51 units. None of these is necessarily the structure which the Government will in due course adopt but they are intended to show a range of possibilities and to aid consideration of the issues involved. Whatever new local authority system is adopted, some change to the existing structure of water and sewerage services will be required.

4.2 The minimum change would be to place the services with the new unitary authorities, and this option is further discussed below. Local government reorganisation, however, provides the opportunity to review the future of the water and sewerage services in Scotland and to identify the best means of securing the necessary investment in the services. The Government wish these opportunities to be considered and in consequence this paper contains a variety of options, both within and outwith the public sector. Each is discussed individually, and by way of introduction a number of general considerations is set out against which all the options must be assessed.

General Considerations

4.3 The Government believe that the new structure for the water and sewerage services in Scotland should be one which is capable of securing the following outcomes:

- water and sewerage services of the highest quality;
- the provision of those services at lowest possible cost to the consumer; and
- the maintenance and improvement of safeguards for the environment.

To achieve these aims it will be necessary to:

- complete successfully a major capital investment programme; and
- ensure maximum efficiency in the management and operation of the services.

4.4 No single structure is likely to achieve all these objectives simultaneously and to the same degree, but different types of structure exhibit different characteristics and degrees of potential.

Scale and Financing

4.5 A discernible trend throughout the history of the water and sewerage services has been the establishment of larger units of operation. Each successive move has been in this direction and this has reflected the changing circumstances which the services have faced and the problems they have had to tackle. During the next 2 decades the technical complexities and costs of providing the services will increase. Efficiencies and economies of scale will be at a premium and this points to the most effective structure being based on rather larger units than is generally the case at present.

4.6 The water and sewerage services are large enterprises by any standard and it will be important both in the interests of the economy as a whole and in the particular interest of achieving the lowest possible prices for consumers that efficiency is maximised.

4.7 A means must be found of securing the large volume of investment which water and sewerage services will need in the years ahead. A structure which opens up opportunities for private sector investment to replace public expenditure could maximise investment potential and also release resources for purposes where there may be no viable alternative to public provision, such as health and education.

Pollution Control and Consumer Protection

4.8 Different structures may also lead to differences in the associated arrangements for controlling pollution and protecting consumers.

4.9 It is essential that a quality product is delivered and that the services are operated in ways which minimise pollution of the environment. It is also desirable that quality monitoring is conducted by bodies other than those providing the services. At present the quality of public drinking water is tested by the water services themselves and monitored by the Environmental Health Officers of the district and islands councils. It will be for consideration whether within a new structure unitary local authorities should continue uniquely to exercise this function or whether monitoring should be reinforced by new arrangements, such as a drinking water inspectorate. There is much to be said for developing the separation of the role of supplier of water and sewerage services from the roles of inspector and regulator.

Discharges of waste water are already controlled by the river purification authorities and the intention is that in due course they will become the responsibility of the Scottish Environment Protection Agency. Monitoring and control of discharges will thus be clearly separate from the sewerage authorities, whatever new structure for water and sewerage is put in place.

4.10 Protection of the interests of consumers will also be a vital element of any new structure. Where services are provided by local authorities and ultimate control is vested in elected representatives consumers have established channels through which their views can be expressed. Where services are supplied by non-elected bodies, whether within or outwith the public sector, different arrangements are generally needed to ensure that consumer interests are fully taken into account. Where services have been privatised special regulatory systems have typically been established to ensure that charges to the consumer are set fairly and that high standards of service are maintained. Consumer committees have also been established to assist with the protection of consumers' interests. These approaches to consumer protection are further referred to in the discussion of individual options below.

Charges

4.11 Charges are already made for public water and sewerage services, directly in the case of water supply and non-domestic sewerage, and indirectly for domestic sewerage through the community charge. Local authorities are already under a duty to keep separate water and sewerage accounts and this means that charges vary to reflect the costs of the services provided. The cost of provision has been rising and is set to continue to rise in the future. This is a direct consequence of the heavy capital investment programme necessary to improve and maintain services at the highest standards. Charges to the consumer will therefore increase substantially whatever the new structure of the services. One of the objectives of restructuring is to ensure that these increases are no higher than necessary.

Chapter 5 The Options

Option (a) Place the Services with the New Unitary Authorities.

5.1 The local nature of the services would be retained and over the years local authorities, of various sizes and configurations, have shown that they can effectively deliver water and sewerage services. Consumer interests would have a voice through ultimate responsibility for the services being vested in elected representatives. On the other hand the trend to fewer and larger units would be reversed. This would be true of any of the 4 illustrative options for reorganisation set out in the local government consultation paper but the significance would vary depending on the precise number of unitary authorities eventually established. A 15 authority model could arguably work as well as the current 12 authority structure, although some joint working arrangements might be needed. Increasingly, however, if more authorities were created the disadvantages of fragmentation would become apparent, to the point where a structure of 51 authorities might encounter real difficulty in providing effective and efficient delivery of the services.

Option (b) Create Joint Boards of the New Unitary Authorities

5.2 The creation of joint boards to undertake services which require a larger area of operation than the structure of local government units allows is precedented; and is acknowledged in the local government consultation paper as a possible way of providing certain services in the future. Joint boards consisting of elected representatives of the constituent authorities would share the positive features of option (a) and could be structured to meet the circumstances of water and sewerage provision whatever number of new unitary authorities emerged. If, for example, the 15 authority model were adopted, a single joint board, covering an area broadly equivalent to the present Strathclyde Region, might suffice with the other unitary authorities each responsible for the services in their own areas. At the other extreme, if 51 new authorities were created something like 12 joint boards might be indicated. Joint boards would also, however, have disadvantages, in particular they would not appear to be the best way to organise services to operate on commercial lines.

Option (c) A Lead Authority Structure

5.3 Under this option one authority would be given responsibility for the water and sewerage services of its own and surrounding areas, the precise boundaries to be determined by reference to the areas of the new local government units and the physical features and constraints of water and sewerage provision. Such a structure would differ from joint boards in that responsibility would lie clearly with a single authority, although there would need to be machinery for consultation and a high degree of co-operative working among all the authorities involved. Although managerially it might have some attractions, this option would also lead to some loss of transparency and accountability so far as consumers were concerned, since many would be water and sewerage customers of authorities other than their own. Otherwise the arguments for and against options (a) and (b) would broadly apply.

Option (d) Create New Water Authorities

5.4 It would be possible to create new public authorities, outside the ambit of local government, with members specifically appointed by the Secretary of State to run the water and sewerage services. Their areas could be tailored to suit the factors particularly affecting water and sewerage provision. Members would be appointed and staff recruited with the appropriate management skills and technical expertise. The creation of several authorities would allow comparison to be made both in economic performance and standard of service. As public sector bodies, however, investment would remain subject to the constraints of public expenditure. Consumer interests would need to be specifically protected in the absence of elected authorities, although there are ample precedents for this and the Citizen's Charter initiative has recently seen a significant strengthening of the consumer's voice in analogous circumstances.

Option (e) Create a National Water Authority

5.5 Essentially this is a variant of option (d) and the same considerations generally apply. A single authority should yield greater economies of scale and provide greater flexibility in the use of resources but, against that, a single body would remove the opportunity for comparative performance that the creation of a number of bodies would allow.

Option (f) Joint Local Authority/Private Sector Schemes

5.6 Arrangements could be envisaged whereby local authorities, or groupings of them, or new water authorities, owned the assets of the services and retained ultimate responsibility for their satisfactory delivery but contracted out their day to day running to the private sector through a process of competitive tendering. This would produce incentives to efficient management and would also provide opportunities for employees of the services to group together and bid for the running of them. The features of options (a) to (e) associated with continued local authority operation or, alternatively, with the creation of new public authorities, would be retained. Similar considerations would also apply in each case in regard to protection of consumer interests. Again, however, investment would be undertaken by a public body and would necessarily be constrained by what the public sector could afford in the light of the requirements of other public services and the priorities accorded to them.

5.7 A variant of this option would involve arrangements where major capital projects were undertaken by private sector contractors who would finance and build the assets in question, operate them for a specified period in return for an agreed fee and then transfer them to the commissioning authority. Arrangements of this kind might spread the cost to the public purse but they do not eliminate it.

5.8 The above 6 options envisage the water and sewerage services remaining essentially within the public sector, although option (f) introduces a degree of private sector involvement. The remaining options involve a clear transfer of the services from the public to the private sector. It is important to record that higher investment and higher charges will be needed whichever sector is responsible for the services.

Option (g) One or more Public Limited Companies

5.9 The essence of this option is that the ownership of assets and provision of services are placed with public limited companies set up for the purpose which are offered to private sector investors. Within this option there is a number of possibilities.

Public Flotation

5.10 This involves the creation of a single or a number of public limited companies (plcs) who would own the water and sewerage undertakings whose shares would be offered for sale and subsequently traded on the Stock Exchange. This was the model followed for the privatisation of water in England and Wales and of other utilities. The companies are exposed to the scrutiny and judgement of the market. There is thus an inducement to efficient management. There is open access to the private sector capital markets, dependent only on the companies' own track record and the markets' assessment of it. The public offering of shares encourages wider share ownership and companies can be created in a pattern which reflects and fosters local loyalties. Employees and consumers can be given a direct stake in their company through special offerings of shares and other benefits.

5.11 The safeguarding of consumers' interests will be the key objective of any restructuring of the water and sewerage services. A company's primary responsibility is to its shareholders. In a competitive market this also, serves the interests of consumers. In conditions of near monopoly, however, such as the water industry would experience, separate provision is necessary to ensure that consumers' interests are properly safeguarded. As described above this can be resolved by the appointment of a regulator and of consumer committees to oversee the pricing policies and other activities of the companies as they impinge on consumers. It would be appropriate to establish such a system in Scotland if this route were followed for the future of the water and sewerage services. The approach adopted in England and Wales is that private water companies are given a licence to provide these services and use all the relevant assets. The legislation gives a major role to the regulator in matters relating to licences. Notice of termination of a licence is long (10 years), but if a company lost its licence the assets needed for essential services would transfer to the new licensee. Thus essential services would be maintained.

5.12 Once a plc is established and its shares freely traded on the Stock Exchange it is open to anyone to purchase control of the company, subject to adherence to the appropriate Stock Exchange procedures and general provisions on monopolies and mergers. This is an integral part of the operation of a free market but in the particular circumstances of newly privatised companies which are listed on the Stock Exchange it is common practice for the Government to retain a power, at least for a time, to approve any takeover or change of controlling interest. This is popularly referred to as a "golden share". It would be for consideration whether there should be such an arrangement in the case of the water and sewerage services in Scotland.

5.13 The Government have obtained advice on the feasibility of the public flotation of the Scottish water and sewerage services and are satisfied that this could be successfully achieved. It is for consideration how many companies there might be and what areas they might cover. A number of variants is possible but structures consisting of one, 2 or 3 companies appear to be viable options. Greater fragmentation would reduce the financial strength of some of the companies to the point where their attractiveness might be in question. Fragmentation would also result in different levels of charges in different parts of the country. This is because units serving a small population, and in particular where that population is spread over a wide area, would have relatively high costs and a relatively low revenue base from which to pay for the capital investment which the services will require. This trend is already apparent in the cost of the water and sewerage services provided by local authorities (see Table 4).

5.14 By way of illustration, options for one, 2 and 3 unit structures could be:

- one company - covering the whole of Scotland;
- two companies - one covering east Scotland (the areas now covered by Lothian, Borders, Fife, Central, Tayside, Grampian, Orkney and Shetland) and a west company (the areas now covered by Strathclyde, Dumfries and Galloway, Highland and Western Isles);
- three companies - a south east company (Lothian, Borders and Fife); a south west company (Strathclyde and Dumfries and Galloway); and a north company (Central, Tayside, Grampian, Highland, Orkney, Shetland and Western Isles).

Other groupings are possible and it might be appropriate to consider separately the position of the 3 islands authorities. They are already unitary authorities providing water and sewerage services for their own populations, and it will be right to give particular consideration to their needs whatever structure is eventually chosen.

Trade Sale

5.15 This has many of the same characteristics as plc flotation except that shares are not offered for public subscription but are disposed of as a block in a negotiated sale to a single purchaser. The procedure is simpler than a public flotation and the purchasing company can be specifically chosen for its ability to run the services efficiently and effectively; and the regulator could ensure that these criteria continue to be met. It could also be used for units which are too small to float successfully on the stock market. This route would not, however, give the opportunity for wider share ownership.

Management/Employee Buy Out

5.16 Management and employees could also have the opportunity to bid under a trade sale. In appropriate areas they could together form a company (which might be a plc) which would then seek to purchase the business. There are successful precedents for this approach. An important factor would be to establish that the management/employee group could command suitable financial backing to ensure that the required investment programme could proceed.

Option (h) Franchising

5.17 This is an alternative route for establishing the services within the private sector. The essence of franchising is that management and day to day operation of the services are carried out, under contract, by a body separate from that which owns the facilities. The day to day operator is called the franchisee and the owner of the facilities - in the case of water: pipes, treatment plants, administrative buildings etc - is called the franchisor.

5.18 Franchising has not traditionally been used for public service utilities in this country but there is wide experience of it elsewhere in the world. It can take a variety of forms. For example, the franchisor might retain responsibility for maintaining and renewing the system and adding to it, and contract with a franchisee or franchisees for management services only; or the franchisor might contract with a franchisee for maintenance and specified capital works as well as for day to day operations and management; or some intermediate arrangement could be put in place. The number of franchisees and the lengths of their contracts can also vary. In short, the franchise system contains sufficient flexibility to allow all the relevant arrangements, including the franchise period, to be tailored to the particular circumstances through the type of franchise awarded.

5.19 Franchise contracts are awarded after competitive tendering and this together with the flexibility of approach offers very considerable scope for management enterprise which stands to benefit the customer. The advice which the Government have obtained on franchising indicates that two approaches would be viable.

Franchisor takes Responsibility for Capital Investment

5.20 Under this approach the franchisor would both own the infrastructure assets and be responsible for capital investment to create new assets. Management and operation of the water and sewerage system would be contracted to franchisees according to the pattern which, in the judgement of the franchisor, would produce the best service for the consumer. The franchisor would be a private sector company. A number of modes of incorporation would be possible. One approach using existing legal structures would be a company limited by guarantee. The directors would be appointed initially by the Secretary of State and could be chosen to provide a blend of technical and financial expertise and ability to represent vigorously the interests of consumers. The external finance required by such a company to finance its capital expenditure would mainly, perhaps entirely, be by borrowing. The absence of equity shareholders would reduce the cost of capital and the requirement for divided payments and this should benefit the consumer through lower charges. The constitution of the company could also ensure that the company could not be taken over and this would be the case if the company was limited by guarantee. The Memorandum and Articles of Association of the company would govern how, after initial appointments, future directors of the company were to be appointed. On the other hand, freedom from takeover and a lower risk environment could remove a spur to efficiency and negate the advantages of the lower cost of capital through a largely debt based structure.

5.21 Prospective franchisees could be drawn from a wide range of firms which offered appropriate services. They would compete to secure operating contracts. There will therefore be pressure on them to maximise efficiency and minimise costs. The benefit of this would be secured for the consumer through the terms of the franchise contracts. There would still be a significant role for the regulator and for consumer committees in supervising the standard of service offered by the franchisee and providing an accessible point of contact for consumers if they had complaints to make. But the main work of the regulator would be in relation to the franchisor. He would be concerned to see that the franchisor incurred capital expenditure efficiently and awarded franchise contracts properly and fairly. He would also be available to arbitrate in the case of any differences between franchisor and franchisee.

5.22 There could be one or more franchisors. The advice available to the Government is that, as with the option (g) and on the same considerations, 3, or at most 4, would probably be the maximum viable number. Each franchisor could, of course, contract with a number of franchisees.

5.23 Under this form of franchising there would be no extension of share ownership but there should be ample scope for employees of the services to form companies to bid for contracts from the franchisor.

Franchisee takes Responsibility for Capital Investment

5.24 The second franchising option envisages capital expenditure as well as the operation of the services becoming the full responsibility of the franchisee. This would result in a simpler structure than the first approach but each franchisee, to be able to undertake the necessary programme of capital expenditure, would need to be a substantial company. The scope, therefore, for flexibility and diversification in the award of contracts for the operation of the services would be severely reduced, and the spur to efficiency that competition to operate the services would produce might be blunted. The franchisee would also be seeking suitable rates of return on capital thereby potentially increasing the cost to consumers. In practice under this option franchise contracts are likely to be few in number and of long duration. Since it would not be possible to foresee or specify in the original contract all capital expenditure to be undertaken over the franchise period, complicated arrangements might be necessary to compensate a franchisee for the cost of capital expenditure which had not been fully recovered at the end of a franchise if he did not regain the contract. There would also be little or no scope for employees to participate in franchise contracts, and, as with the other approach to franchising, no extension of share ownership.

5.25 As with the first approach to franchising there would be a significant role for a regulator and for consumer committees in safeguarding the consumers' interests. Capital expenditure as well as operational matters would depend largely on the terms of the franchise contract and there would be some overlap in the function of franchisor and regulator. The franchisor might, as before, be established as a private sector company but in view of the similarity of his role to that of the regulator it would be for consideration whether the two roles might be combined in a single body.

5.26 A diagram showing the structure of the two franchise options as compared with all purpose water and sewerage bodies is shown in Annex A.

Chapter 6 Other Matters

The Central Scotland Water Development Board (CSWDB)

6.1 The Board has served Scotland well in providing bulk supplies and a strategic reserve of water for the central belt. It is for consideration whether, under a new structure, its role would be overtaken by the functions and opportunities which the new bodies would have to plan for meeting the demands of their areas in the future. Under most of the options considered here the CSWDB could also be absorbed into the body or bodies responsible for providing the service in the appropriate area. But it is also possible that in some options it could remain as an independent body.

Transitional Arrangements and Staffing Considerations

6.2 The Government recognise that transitional arrangements may be needed before a new structure is put fully in place. This is likely to apply particularly if the services become the responsibility of the private sector. The Government recognise too that the creation of new structures will mean a period of stress and uncertainty for staff. These issues cannot be fully addressed until the pattern of the new structure is clear but the Government accept that they must be approached carefully and with understanding. They will be taken fully into account in working out the detailed arrangements for the future of the services. There will also be transitional costs in moving to a new system but given that change will be inevitable alongside local government reorganisation, variation between the transitional costs of the various options is unlikely to be a determining factor.

Questions for Consideration

6.3 The following questions identify some of the main points addressed in this consultation paper.

1. Given the many claims on public sector resources and the scale of the investment that will be required over the next decade, how can the financial needs of the water and sewerage industry best be secured?

2. Which of the options set out would be likely to deliver the most efficient service, and why?

3. Which of the options set out would deliver the services at least cost to taxpayers, and why?

4. To what extent should further economies of scale be sought in the new structure?

5. What geographic division of the country seems best, given that variations in costs in different areas will be reflected in charges?

6. Are there ways in which comparisons among public service providers might adequately substitute for market disciplines in securing efficient management?

7. If the services move to the private sector there is a choice between the plc route, which combines ownership and operation of the systems, and franchising, which separates these functions. Views are invited on which might be preferable.

8. Do the various options adequately provide for the protection of the consumer? Which options seem to do so best? Should alternative or additional arrangements be considered?

9. Views are invited on the need for a Drinking Water Inspectorate for Scotland to be established.

10. Views are invited on whether a part might be played in a new structure by the Central Scotland Water Development Board.

11. Overall, which of the options seems most likely to meet the objectives for the water and sewerage services in the years ahead?

12. The islands councils currently undertake water and sewerage services for their areas, which have unique features. Should these areas continue as discrete units within a new structure?

Invitation to Comment

6.4 Further options, or variants of options, could be devised and the Government are not necessarily restricted to selecting one of those set out in this paper although they represent the main avenues of approach likely to prove feasible. The Government wish all options to be carefully considered and will decide on the way forward in the light of responses to this consultation paper.

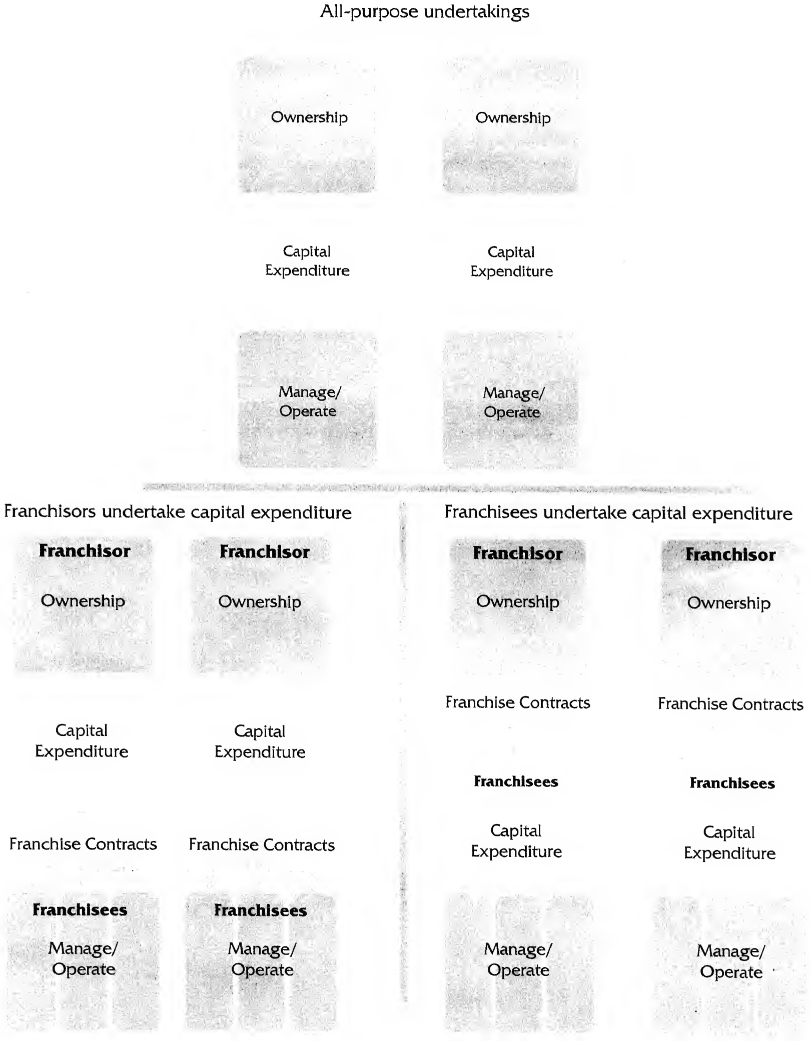
6.5 The Government will welcome the views of interested parties on the issues and options raised in this paper and on the particular questions posed. These responses should be submitted in writing by 29 January 1993 to The Scottish Office Environment Department, Water Restructuring Division, Room 203A, 27 Perth Street, Edinburgh, EH3 5RB.

6.6 The Government may wish to publish responses to this paper in due course or to deposit them in the libraries of the Houses of Parliament and The Scottish Office library. If respondents wish their comments to be treated as confidential they should state this clearly. It will otherwise be assumed that responses can be published. All responses may, in any event, be included in any statistical summary of numbers of comments and views expressed.

For further copies please contact

The Scottish Office Environment Department
Water Restructuring Division
Room 203A
27 Perth Street
Edinburgh
EH3 5RB
Telephone 031-244 2932

Illustrative Structure of Various Options
Based on 2 Units for Scotland



All-purpose undertakings

Ownership

Ownership

Capital
Expenditure

Capital
Expenditure

Manage/
Operate

Manage/
Operate

Franchisors undertake capital expenditure

Franchisor

Ownership

Franchisor

Ownership

Capital
Expenditure

Capital
Expenditure

Franchise Contracts

Franchise Contracts

Franchisees

Manage/
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